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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,985	07/07/2003	Hajime Akiyama	239861US0	6382

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EXAMINER	
NADAV, ORI	

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/612,985	AKIYAMA ET AL.	
	Examiner	Art Unit	
	ori nadav	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) *8-15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 July 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/7/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of claims 1-7 on 6/29/2004 is acknowledged. The traversal is on the ground(s) that the process, as outlined by the Examiner, is not capable of being carried out to form the device of Group I, since the process of Group II, as outlined in figures 7-10 and discussed in the specification on pages 21-28, clearly shows the impossibility of depositing a second buried insulation 3-2 first in the element shown in figures 7-10 and then forming the first buried insulation film 3-1 immediately above the second buried insulation film and in contact therewith. Applicant further argues the Patent and Trademark Office has not shown that a burden exists in searching all of the claims. Applicants respectfully point out that thousands of U.S. patents have issued in which many more than two subclasses have been searched, and the Patent and Trademark Office can not reasonably exert that a burden exists in searching only two subclasses.

This is not found persuasive because the examiner's suggestion of first forming a second buried insulation film in said region and then forming a first buried insulation film immediately above said second buried insulation film in contact therewith, instead of forming a first buried insulation film in said region and then forming a second buried insulation film immediately beneath said first buried insulation film in contact therewith, is not based on the process outlined in figures 7-10 and discussed in the specification on pages 21-28. This is an alternative process of forming the device, wherein the second buried insulation film is first formed and then the first buried insulation film is

formed immediately above said second buried insulation film and in contact therewith. The remainder of the device is then formed on the first buried insulation film. Furthermore, the two separate and distinct inventions are classified in two separate classes and not in two separate subclasses, as argued by applicant. A burden exists on the examiner in searching and considering two separate and distinct inventions, classified in two separate classes.

The requirement is still deemed proper and is therefore made FINAL.

Specification

The abstract of the disclosure is objected to because the abstract should not recite a claim language. Correction is required. See MPEP § 608.01(b).

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, a first auxiliary dielectric layer disposed immediately below said second semiconductor layer, as recited in claim 1, and a first auxiliary dielectric layer is shaped in a cylindrical form and in a bowl-like form, as recited I claims 3 and 4, respectively, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> **The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.**

Claims 1-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no adequate description in the disclose and in the drawings for a first auxiliary dielectric layer disposed immediately below said second semiconductor layer, as recited in claim 1.

There is no support for a second auxiliary dielectric layer is disposed between said first auxiliary dielectric layer and said primary dielectric layer, wherein the first auxiliary dielectric layer having at least a portion junctioned to a second main surface of said primary dielectric layer, as recited in claim 5.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claimed limitations of a first auxiliary dielectric layer disposed immediately below said second semiconductor layer, as recited in claim 1, are unclear as to how the first auxiliary dielectric layer can be disposed immediately below said second semiconductor layer since the first semiconductor layer and the primary dielectric layer are located there between.

The claimed limitations of one end of a first auxiliary dielectric layer extending over a region of a size not smaller than 40% of a distance between said first main electrode and said second main electrode, as reicted in claim 2, is unclear as to how an end of a layer can extend over a region.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4 and 7, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Akio (Jp9-172189) in view of Cogan (4,860,081).

Akio teaches in figure 2 and related text a dielectric separation type semiconductor device, comprising:

A semiconductor substrate 11;

a primary dielectric layer 13 disposed adjacent to a whole region of a first main surface of said semiconductor substrate;

a first conductivity type first semiconductor layer 4,15 of a low impurity concentration disposed on a surface of said primary dielectric layer 13 in opposition to said semiconductor substrate so that said primary dielectric layer is sandwiched between said first conductivity type first semiconductor layer 15 and said semiconductor substrate;

a first conductivity type second semiconductor layer 17 of a high impurity concentration formed selectively on the surface of said first semiconductor layer;

a second conductivity type third semiconductor layer 19 of a high impurity concentration disposed so as to surround an outer peripheral edge of said first semiconductor layer with a distance;

a ring-like insulation film 14 disposed so as to surround an outer peripheral edge of said third semiconductor layer;

a first main electrode A disposed in contact with a surface of said second semiconductor layer;

a second main electrode K disposed in contact with a surface of said third semiconductor layer;

a sheet-like back-surface electrode (ground) disposed adjacent to a second main surface of said semiconductor substrate on a side opposite to said first main surface of said semiconductor substrate; and

a first auxiliary dielectric layer 12 disposed immediately below said second semiconductor layer and having at least a portion junctioned to a second main surface of said primary dielectric layer .

Akio does not teach a back-surface electrode being a sheet-like back-surface electrode.
Cogan teaches in figure 8 and related text a sheet-like back-surface electrode 31.
It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form a sheet-like back-surface electrode in Akio's device in order to provide better electrical contact to the device.

Regarding claim 2, Akio teaches a first auxiliary dielectric layer is so disposed that one end thereof is located at a position corresponding to said first main electrode and extends over a region of a size not smaller than 40% of a distance between said first main electrode and said second main electrode.

Regarding claim 3, Akio teaches a first auxiliary dielectric layer having a bottom and junctioned to both of said semiconductor substrate and said primary dielectric layer. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a first auxiliary dielectric layer shaped in a cylindrical form in Akio's device in order to simplify the processing steps of making the device.

Regarding claim 4, Cogan teaches in figure 8 a first auxiliary dielectric layer having a bowl-like form. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a first auxiliary dielectric layer shaped in a bowl-like form, as taught by Cogan, in Akio's device in order to provide better insulation between the active areas of the device.

Regarding claim 7, Akio teaches a semiconductor substrate includes a p-type semiconductor region formed integrally with said semiconductor substrate.

Claims 5-6, insofar as in compliance with 35 U.S.C. 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Akio and Cogan, as applied to claim 1 above, and further in view of Linn et al. (5,387,555).

Akio and Cogan teach substantially the entire claimed structure, as applied to claim 1 above, except a second auxiliary dielectric layer being disposed between said first auxiliary dielectric layer and said primary dielectric layer. Linn et al. teach in figure 5b a second auxiliary nitride dielectric layer 519 being disposed between first auxiliary dielectric layer 506 and a primary dielectric layer 513. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a second auxiliary nitride dielectric layer between said first auxiliary dielectric layer and said primary dielectric layer in Akio's device in order to provide better isolation to the device.

Regarding the process limitations recited in claim 6 ("second auxiliary dielectric layer is formed by a thermally nitrided film or alternatively by a CVD nitride film") these would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced.

Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722

and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(571) 272-1660**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**

O.N.
8/7/04

ORI NADAV
PATENT EXAMINER
TECHNOLOGY CENTER 2800